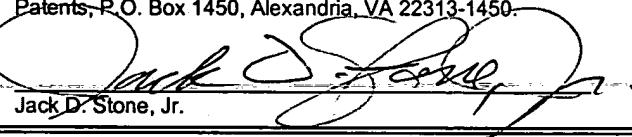


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MULTI-USER, UNIVERSAL DATA CONVERSION AND COMMUNICATION HUB

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MULTI-USER, UNIVERSAL DATA CONVERSION AND COMMUNICATION HUB**CLAIM OF PRIORITY**

This application claims priority from U.S. Provisional Patent Application No. 60/432,451 entitled "MULTI-USER, 5 UNIVERSAL DATA CONVERSION AND COMMUNICATION HUB" filed on behalf of Alfred A. Zwanenburg, et al, on December 11, 2002 (Attorney Docket No. 1490.103).

TECHNICAL FIELD

The present invention relates in general to the field 10 of electronic commerce and communications and, more specifically, to a method and system for transferring data between multiple entities and remotely situated devices or applications utilizing disparate data formats.

BACKGROUND

15 Greatly expanded use of electronic communications, including the Internet, intranet, Wide Area Networks (WAN), Virtual Private Networks (VPN), and the World Wide Web (WWW), has resulted in the creation of new data centers and information topologies which are without a specific 20 centralized geographic location, yet contain information that is of great value to, and needed by, users who also may be dependent on applications that utilize local data storage devices in addition to these external communications networks. Users are becoming increasingly 25 dependent upon information being conveyed through

telecommunications-based technologies utilizing disparate systems and information repositories.

Technology has thus greatly increased the capabilities and functions of electronic applications and devices and it
5 is safe to assume that technological innovation will continue for the foreseeable future. The result is a continued proliferation of electronic and telecommunications vendors offering a massive number of applications and devices that continue to undergo rapid
10 evolution and change. For example, a number of data processing vendors have developed best-of-breed software solutions for business enterprises in the areas of Sales Automation (SA), Customer Relations Management (CRM), Supply Chain Management (SCM), Partner Relationship
15 Management (PRM), Enterprise Application Integration (EAII), Enterprise Resource Planning (ERP), and the like. The databases of many of these applications are physically distinct and the data formats themselves are as different as the applications that have been developed by the
20 different vendors. Furthermore, the separate and distinct enterprise applications are often utilized by various corporate departments that have their own inter-departmental communications challenges. In addition to these diverse enterprise applications, new devices, many of
25 which are mobile (e.g., cell telephones, Personal Digital Assistants (PDA), laptop computers, and the like) have proliferated and are increasingly being employed for receiving and sending important and timely data that

relates to both business and personal activities through both landline-based and wireless applications. Finally, the Internet has become an additional source of data generation and dissemination wherein interfaces with third 5 parties, external to the organization, are often established, in addition to traditional e-commerce activities.

Technological innovations have also developed rapidly in the consumer arena. Some examples of new capabilities 10 for consumers include on-line purchasing, on-line investing, on-line banking, e-mail, new photographic systems (in digital, analog, or physical files), alternative video systems (including VHS, DVD, HDTV and the like), cable video and data communications, satellite, on-15 line personal bill paying, home and on-line collaborative-based electronic games, as well as home-based businesses which require accounting, banking, and electronic record storage. Consumers are thus provided an ever-increasing array of ever-changing, more-powerful, sophisticated and 20 complex applications and capabilities from vendors which offer their own applications and/or devices.

Many of the above innovations are based on proprietary or vendor specific technology. The rapidly increasing variety of applications and devices has resulted in a 25 virtual explosion of formats, standards, and systems that vendors and/or users must address to achieve some measure of interoperability, integration, and communications.

There are a number of means that are available to facilitate communications between disparate technologies. However, it is impractical to implement integration and communications functionality through a peer-to-peer topology or customized database technology. A peer-to-peer topology would require that customized data translation interfaces be created between each party of paired parties employing disparate formats. And each customized data translation interface is generally costly to implement and to maintain. This may be illustrated mathematically by considering the number of interfaces that are required for a number of technologies. If N is the number of technologies, then the number of interfaces that are required will be $[N*(N-1)]/2$. Accordingly, the number of interfaces required to enable these technologies to successfully communicate with one another thus increases geometrically as exemplified below:

| <u>Technologies (N)</u> | <u>Interfaces</u> |
|-------------------------|-------------------|
| 2 | 1 |
| 3 | 3 |
| 4 | 6 |
| 5 | 10 |
| 6 | 15 |
| ... | ... |
| 10 | 45 |
| 15 | 105 |
| 20 | 190 |

Compounding the challenge to integrating applications and devices is the fact that applications and/or devices are often remote and physically distinct from other 5 applications and/or devices to which they need to be integrated. For example, a web site which sells a company's products may need to convey: (1) catalogue data to customers, (2) customer registration data to the customer service department, (3) accounts receivable or 10 invoicing information to the accounting department, (4) payment data to the treasury department, (5 and 6) inventory information may need to be uploaded both to and from the web site from the warehouse or operations department, (7) shipping information may need to be 15 submitted to the web site, and (8) a product credit may be sought by the customer over the web based on the customer's feedback after receiving the shipment. In the above example, this one application (e.g., the user's web site) interfacing to one supplier has embodied 8 different points 20 of integration (also referred to as "touch points") with applications of the enterprise, many of which are likely to be physically separated. Finally, a user might also wish to store such information in a centralized off-site storage location. With multiple discrete and disparate systems, one 25 might not be readily available to store all such information. A further consideration is that some of the above 8 actions may also be undertaken from a personal digital assistant, mobile telephone, a mainframe computer,

a laptop computer, or a regional sales office utilizing a local area network. Furthermore, it is simply not cost-effective or practical for each individual, company, or vendor to develop, implement, and maintain the interfaces 5 and communications that are necessary to achieve cross functionality and communication to each and every other system or entity that may utilize the information.

There has been a proliferation of software applications and hardware devices which are targeted toward 10 addressing specific needs of users. However, a common misperception by applications and device vendors - that development of an open standard is at odds with an individual vendor's best interest - has contributed to a proliferation of standards for applications and devices. 15 While the proprietary approach is being increasingly discredited by customer desires and pressures for improved cross application data integration, the established positions of many of these vendors along with their desire to establish proprietary formats has maintained the virtual 20 explosion of formats, systems, and applications that do not facilitate open communication and transfer of information across disparate platforms, technologies, and applications. The user is still left in many instances, economically stranded on a wide variety of "technology islands", or is 25 trapped within "information silos", and is thus immersed in a sea of application and device formats that are each very beneficial in and of themselves, but which are also

typically unable to allow for easy cross-communications and collaboration.

To address the enormous data integration needs of companies, a number of vendors have developed products in 5 an area that is termed Enterprise Application Integration (EAI). These products include BizTalk (from Microsoft), WebSphere (from IBM), iWay (from iWay Software/Information Builders), Universal Application Network (UAN, from Siebel Systems), OrderWare (from UNISYS), Rendezvous (from Tibco), 10 Ebridge (from Ebridge Software), Sunopsis (from Sunopsis), Data Mirror (from Data Mirror), Data Junction (from Data Junction), and Xaware, (from Xaware Technology), as well as many others. Each of these products focuses on integration from the perspective of enabling a single business 15 organization to implement its own platform for accessing multiple parties, whether internal or external to the organization.

One key challenge for managing data integration between applications are the processes and systems for 20 sending and receiving the discrete, indivisible elements of data, called messages. Some software vendors have provided development tools to address this need under what is generally termed Message Oriented Middleware (MOM). IBM's MQ Series, MSMQ from Microsoft, and JMS (Java Messaging 25 Service) are well known MOM products that enable message creation and transmission in applications. These and other vendor technologies represent the current state-of-the-art systems for handling messaging functions.

A second challenge that arises when providing data communication between applications or devices is how to receive and pass data into applications or devices from any source that is external to that application or device. The 5 solutions offered to this challenge are generally found in several areas. The first area of solutions utilize Extract, Transform, and Load (ETL) tools, which are applications capable of retrieving data from an application. The second area of solutions utilize 10 Application Programming Interfaces (APIs), and are offered by some application vendors to enable a developer to program an application which can directly access data from, and insert data into, the application independently of the application itself. The third area of solutions utilize 15 database connectivity standards (such as ODBC, JDBC and the like), which are programming interfaces that enable applications to access data in database management systems (RDBMS or DBMS) that use a query language such as Structured Query Language (SQL) as a data access standard. 20 In addition, some companies (often the same ones that provide data integration products) have developed pre-packaged adapters, which are programs specifically designed for accessing data from certain well-known applications. Others offer full blown Software Development Kits (SDKs), 25 which are similar to Application Programming Interfaces, except with greatly enhanced functionality. Adapters or SDKs are generally provided for well-known accounting packages such as Quickbooks (from Intuit), Peachtree, Great

Plains, and many others. The integration solutions are often implemented programmatically as dynamic link libraries (DLLs) offering direct linkages to the underlying fields of the application.

5 Another example of an integration tool is the Value Added Network (VAN) which has developed for providing standardized cross enterprise communication. VAN's are privately owned networks that provide services for fees. A VAN usually offers some service or information that is not
10 readily available on public networks by providing a central facility for converting data from a provider's format to an alternative format such as Electronic Data Interchange (X.12 or EDIFACT). VANs are directed primarily at the need for data communication between trading enterprises where
15 one of the parties has standardized on the Electronic Data Interchange (EDI) format.

The aforementioned message, data integration, data communication, adapter and other development tools may be utilized in the areas of Enterprise Application Integration (EAI), data mining, EDI transaction processing, and data warehousing. However, although useful (or even fundamental) in performing data integration, data mining EDI processing, and warehousing functions, none of these systems provide easy and configurable data format
25 transformation capabilities coupled with communications between remotely situated and disparate systems of different parties. For example, none of these systems provide an Internet-based service that can provide easily

implemented data transformations and communications between remote publishers and subscribers from different organizations using different formats and applications.

Therefore, while the aforementioned development tools 5 and applications are useful for implementing certain types of integration, what is needed is an inexpensive and easy-to-deploy, yet powerful and flexible, capability that can enable any number of interface systems to be easily and cost-effectively created, implemented, and then offered to 10 distinct entities operating different systems at different locations so that they can quickly and effectively establish and maintain data communications and integration.

SUMMARY

The disclosed invention is a method and system for 15 communicating Events between a source object associated with one or more publishers and a target or destination object associated with one or more subscribers, wherein such publishers and subscribers utilize disparate formats and are remotely situated. An Event is preferably first 20 generated by one or more publishers, then processed by a Communications & Conversion Engine (C&C Engine) based on a Conversion Profile associated with it, and then preferably requested by one or more subscribers. Events are preferably generated by Publishers and preferably requested 25 by Subscribers through data processors, such as applications, devices, and/or the like. The C&C Engine is thus an event-driven intermediary data conversion, storage, and transmission engine which can convey information

between the data processors of publishers and subscribers. The invention can thus communicate data without restriction between data processors across multiples of publishers and subscribers by such means as data processors are able to 5 send and receive Events that have been converted into mutated Events based on each Event's associated Conversion Profile.

The invention utilizes a hub and spoke topology to process each Event based on a Conversion Profile. A 10 Conversion Profile consists of three components: Addressing information (which identifies the users, namely publishers and subscribers); a Map Template (which defines the conversion information); and Communications information (which manages the receipt, storage, security, and 15 transmission of information between parties).

The invention thus provides communication of an Event between any number of publishers associated with the source object and any number of subscribers associated with the target or destination object even when such publishers and 20 subscribers: a. utilize disparate formats; b. are remotely situated; c. are either on-line or not on-line with one another at any given moment; and d. are different legal entities or organizations. Because the invention can receive information from remote publishers, convert 25 information into alternative formats, and store or transmit information to remote subscribers in real time, through a scheduled process, or in batches either synchronously or asynchronously, the invention performs its functions

independently of any application, device, vendor, format, time based communication restriction, or physical location.

BRIEF DESCRIPTION OF THE DRAWINGS

For a more complete understanding of the present 5 invention, and the advantages thereof, reference is now made to the following descriptions taken in conjunction with the accompanying drawings, in which:

FIGURE 1 illustrates the general architecture of sources objects and targets objects connected to a wide 10 area network for the purpose of enabling information to be processed in accordance with the present invention;

FIGURE 2 is a schematic drawing showing the flow of information from Publishers and Source Objects through the C&C Engine for reception by Subscribers and Target Objects;

15 FIGURE 3 depicts certain databases and storehouses associated with the invention;

FIGURE 4 illustrates a process for creating a Conversion Profile, which will define the users, (Publisher(s) and Subscriber(s)), Map Template, and 20 Communications Information associated with processing an Event; and

FIGURES 5A, 5B, and 5C are a flow chart that depicts one example of the present invention for transferring an Event from a publisher, and converting and communicating 25 the Event through the C&C Engine to a Subscriber.

DETAILED DESCRIPTION

In the following discussion, numerous specific details are set forth to provide a thorough understanding of the present invention. In some instances, well-known elements 5 have been illustrated in schematic or block diagram form in order not to obscure the present invention in unnecessary detail. Additionally, for the most part, details concerning computers, browsers, the Internet, the World Wide Web, communications networks, e-mail, firewalls, 10 databases, data communications, security and encryption/decryption protocols, programming languages, protocols, and communications and integration technologies (e.g., HTTP, HTTPS, HTML, XML, XML Schemas, XSLT, XDR, SOAP, AIC, CORBA, DLL, EJB, MQMS, MQ Series, JMS, J2EE, 15 COM, DCOM, FTP, RDBMS, SQL, RPC, SMTP, POP, PKI, SSL, MIME, S/MIME and the like), database design elements (e.g., join tables, keys, indexes, and/or data attributes such as company name, SKU, product description, product categories), and the like have been omitted, except insofar 20 as necessary to describe the present invention, inasmuch as such details are not considered necessary to obtain a complete understanding of the present invention, and are considered to be within the skills of persons of ordinary skill in the relevant art.

25 It is noted that, unless indicated otherwise, all functions described herein are performed by a data processor in accordance with code. As used herein, the term "data processor" shall include and be used to refer to

any one or more of a microprocessor, a microcontroller, an application, an application-specific integrated circuit (ASIC), a device (e.g., a personal digital assistant (PDA), a mobile telephone, or the like), an electronic data processor (EDP), a computer, and/or the like. Furthermore, as used herein, the term "code" shall include and be used to refer to any one or more of program code, software, integrated circuits, read-only memory (ROM), and/or the like, effective for instructing the data processor how to perform such functions. Still further, it is considered that the design, development, and implementation details of all such code would be apparent to a person having ordinary skill in the art based upon a review of the present description of the invention.

In its simplest form, the invention is an event-driven receive-convert-store-forward data processing engine for use in facilitating communication of disparate data between distinct parties and between remotely situated applications or devices that may be accessed, configured, and then implemented through the Internet.

Referring to FIGURE 1 of the drawings, the reference numeral 100 generally designates a system 100 embodying the architecture of the present invention. The system 100 exemplifies a general topology having one or more Sources 25 Objects 105 exemplified in FIG. 1 as Source Object A, Source Object B, Source Object C, Source Object D, and Source Object N, which are able to define Events for communication and transmission through a communication

network 101 to a communications and conversion ("C&C") Engine 126 and thereafter to one or more Targets Objects 130 exemplified in FIG. 1 as Target Object W, Target Object X, Target Object Y, and Target Object N. As shown in 5 conjunction with Source Object C and Target Object Y by means of Source Adapter C and Target Adapter Y (respectively), it is understood that all Sources Objects 105 and Targets Objects 130 programmatically embody additionally such capabilities as are necessary to enable 10 communication and transmission of data to the communication network 101 and C&C Engine 126 by utilizing adapters when such adapters are needed. As will be explained in detail below, users (publishers and subscribers) are associated with Sources Objects 105 and Targets Objects 130 through 15 utilization of data processors, which may include both conventional computers on which may operate a vast array of applications, as well as devices of more limited use (such as a personal digital assistant or a mobile telephone).

Each example of a specific Source object 105 or Target 20 object 130 as represented in the invention embodies the capability in which a specific application (such as a specific version of the accounting program Quickbooks) or a device (such as a mobile telephone utilizing a certain text or voice messaging technology) is able to submit or receive 25 Events by means of the invention. Specifically, each of the Sources Objects 105 and Target Objects 130 is preferably designed so as to enable data to be made indivisible, distinct, and subject to reference (i.e.,

where it may be tracked to specific users and sessions), so that it may be generated, transmitted, converted, and/or received as a message, referred to herein as an "Event". Such capabilities of each specific Source object 105 (or 5 Target object 130) may thus be utilized by any number of Publishers (or Subscribers), which in turn may constitute different legal entities, although they may nonetheless utilize by design a common Source (or Target) object. Thus, with respect to the general system design, each user 10 associated with any of Sources Objects 105 or Targets Objects 130 may utilize (i.e., inherit the capabilities of) a data processor such as an application (e.g., an accounting program) and/or a device (such as a personal digital assistant ("PDA") or a mobile telephone) and 15 therefore each Source Object or Target Object may be associated with many different users within different companies or organizations.

The appropriate hardware for implementation of the C&C Engine 126 preferably comprises high-capacity data storage 20 systems, such as Network Attached Storage (NAS) devices. The C&C Engine 126 will preferably also utilize powerful Internet-based servers (such as a high-performance web server) and high-speed telecommunications, as are commonly designed, assembled, and operated by persons of ordinary 25 skill in the art. The communication network 101 is preferably the Internet, the World Wide Web (WWW), a Wide Area Network (WAN), an intranet, a Virtual Private Network (VPN), a telecommunications network, or any other suitable

communication network, effective for transmitting data between computers. The communication network 101 preferably employs Internet protocols such as HTTP and TCP/IP, but may also utilize any other communications 5 protocol. Alternatively, or in addition, the invention can be used to update disparate locally proximate applications or devices.

As a general reference in the invention, databases are known to utilize database management systems (DBMS) which 10 are designed for storage, access, retrieval and management of large quantities of data as are provided by products from Microsoft (for example SQL Server) or IBM (for example DB2) or any other database vendor. Storehouses in the invention are preferably groupings of like functional types 15 of data or programs that are typically constructed in disparate formats and heterogeneous structures. Therefore, storehouses in the invention are typically large repositories of files which contain data or functional elements that are not well-suited, or may not be suited at 20 all, for storage and management using database management systems.

FIGURE 2 is a general diagram in which users consisting of Publisher(s) 210 and Subscriber(s) 220 are coupled with the C&C Engine 126 via the communication 25 network 101. Publisher A utilizes a data processor in which an application not shown (such as, by way of example, a web site taking orders) is coupled with the Source Object K and a Source Adapter K, which adapter is configured for

processing Publisher A (sales) data for its transmission as an Event to the C&C Engine 126 which then passes such Event after conversion on to Subscriber Y.

5 In FIGURE 2, the C&C Engine 126 processes Events it receives from publishers via the communication network 101, through its Communications Functions 207, for conversion through its Processing Functions 206 with storage and retrieval as needed from Databases & Storehouses 205. After the received Event has been converted (or "mutated") 10 by the C&C Engine 126, it is then retrieved by Subscriber Y via Target Adapter M, which provides the appropriate insertion capabilities into Target Object M (such as an accounting program of Subscriber Y operating on a computer located at the office of the Subscriber Y).

15 In the above instance, Publisher A is exemplified as a web site that generates ("pushes") sales data, and Subscriber Y is exemplified the accounting program (also associated with that Publisher A) that retrieves ("pulls") sales data from the web site of Publisher A via C&C Engine 20 126. So Publisher A (a vendor of products) may be described as associated with a particular Source object K and the Source object K may be considered more generally as any web site that generates a source file representing sales. Similarly Subscriber Y is exemplified as associated 25 with Target object M and the Target object M may be considered more generally as any accounting application which accepts sales data. As such and under specific further definitional conditions, Source object K and Target

object M may be used by any number of users of these same needs. Thus, Source objects and Target objects are meant to generally be applicable to users based on similarities of needs. Programmatically, this will lead to reusability 5 of code and systems for users and thus reduce implementation costs dramatically over time.

As described above, Publisher A and Subscriber Y both utilize adapters for retrieving and inserting information from and to their respective Source and Target Objects. 10 Adapters, such as Source Adapter K and Target Adapter M, are primarily utilized when their respective data processors (such as applications, devices, and the like), which need to access the C&C Engine 126 (as publishers or subscribers), require further action or modification to 15 allow such access to occur. Each source adapter or destination adapter is functionally a limited purpose computer program whose primary, if not sole, purpose is to manage the respective retrieval of information from publishers or insertion of information to subscribers and 20 perhaps to negotiate certain actions, preferably with respect to event initiation, acknowledgment, and closure as appropriate. These adapters will be triggered in response to an action from a program that is external to the adapter itself. As has been noted previously in the background 25 description above, adapters are commonly used and may be developed by means of ETL, API, or DLL programs or by means of some other data access mechanism. For use in the invention, when an adapter is needed, it is preferably

developed and deployed as a Dynamic Link Library (DLL) which can then be reused across common applications or devices, with only limited customization as may be needed for each specific instance of a publisher or subscriber.

5 Although in the above examples adapters have been used, in some examples adapters are optional and may not be needed. In Figure 2, Publisher B and Subscriber Z are each illustrated as having access to communication network 101 without use of adapters. This may apply in instances where
10 a Source object or a Target object is able to take advantage of SOAP (Simple Object Access Protocol).

The system 100 is preferably designed using SOAP as the communications protocol. SOAP preferably employs XML (extensible markup language) syntax to send text commands
15 across the Internet using HTTP. If the transmission protocol is SOAP, then the C&C Engine 126 will preferably employ caching which facilitates virtually instantaneous transmission of Events between publishers 105 and subscribers 130, which transmission is limited
20 substantively only by the transmission speeds of the physical network (e.g., communication network 101) itself.

In addition, if all the applications or devices associated with publishers and subscribers of a given Event support SOAP, then the data can be passed directly to and
25 from the system 100 without conversion of formats. However, if the application or device associated with the Source object of a Publisher(s) 210 or Target object of a Subscriber(s) 220 does not support SOAP (or some other

"wrapper" type protocol), then an adapter (e.g., a DLL) is generally preferred. By using an adapter, a legacy system not supporting SOAP directly may nonetheless process an event of a disparate format via the C&C Engine 126 when 5 that event is associated with a source or target object that employs SOAP.

FIGURE 3 presents in further detail the databases and storehouse associated with C&C Engine 126. For example, an Accounts database 310 includes financial and biographical 10 data for each of the Account holders who will use the system to establish the Publisher(s) 210 and Subscriber(s) 220 which will be users of the C&C Engine 126. A Sources & Targets database 320 comprises the users, i.e., the Publisher(s) 210 and Subscriber(s) 220 that will access the 15 C&C Engine 126. An Event Types database 330 includes Event Types (which are the various categories under which Conversion Profiles are organized) and Topics (which are the various categories under which Event Types are organized) associated with the C&C Engine 126. An Adapters 20 Storehouse 340 represents a collection of all adapters as may be provided by the C&C Engine 126 to Account holders, although adapters may also be developed and sourced from third parties other than C&C Engine 126. A Conversion Profiles database 350 includes associated publisher(s) 105 and subscriber(s) 130, a map template, and communication information associated with the processing of an Event. An 25 Events Storehouse 360 preferably includes each Event processed through the C&C Engine 126 (preferably both pre-

conversion and post-conversion), which are preferably stored as XML files. An Event Log database 370 is a tracking reference repository to record each occurrence of receipt, storage, conversion, and transmission of Events 5 between Publisher(s) 210 and Subscriber(s) 220.

FIGURE 4 illustrates a process for creating Conversion Profiles. In a preferred embodiment of the invention, utilizing the Internet for the communication network 101, a user (not shown) accesses a web site which includes the C&C Engine 126. In step 400, a user logs on to access the system 100 and C&C Engine 126, and in step 405, a determination is made whether the user is a new user to the system 100 and C&C Engine 126. If it is determined that the user is not new to the system 100 and C&C Engine 126, 10 then execution proceeds to step 420; otherwise, execution proceeds to step 410. In step 410, the user is registered as an Account holder with a new account to which Conversion Profiles (discussed below) that are created may be associated. As an Account holder, the user is registered 15 in the Accounts database under a single Account which will be used for tracking all of that user's activities on the system 100.

Establishing the Account holder as denoted in step 410 is necessary because the typical organization (Account 25 holder) will have many "touch points" through which they interact with other entities and/or other systems and which therefore require a multitude of Conversion Profiles with differing publisher/subscriber roles. Thus an entity may be

a Publisher for one Event Type (such as a supplier in providing a Catalogue) and a Subscriber for another Event Type (such as a supplier accepting an Order). In fact, as noted above each Account holder will typically be 5 associated with both a number of Conversion Profiles and any number of Publisher/Subscriber Roles. The Account holder also may be used as a billing entity so that charges may be assigned to the proper party that is associated with usage of the C&C Engine 126. Some information that would 10 preferably be captured by the Accounts Data Base follows in Table 1 below.

Table 1

Certain Information Included in Account Database

5

AccountID
Master Username
Master Password
Master Security Code

10

Company Name
Contact Name
Telephone
E-mail
Fax
Address City, State, Country
Billing Information

Following step 405 or completion of registration in
20 step 410, in step 420 a unique Conversion Profile ID is
created and is stored in the Conversion Profiles database
340. The user next proceed to define all the elements of
the Conversion Profile.

Conversion Profiles preferably include all the
25 necessary elements for an Event to be processed between one
or more Publisher(s) 210 and one or more Subscriber(s) 220.
There are preferably three general components that define a

Conversion Profile as denoted in step 420. These three general components include

(1) Addressing Information, for registration of the Publisher(s) 210 and Subscriber(s) 220,

5 (2) Map Template(s), to define the publisher(s) 210 and subscriber(s) 220 file formats, structures, and conversions, and

10 (3) Communications Information, which defines all the transmission information that is required for communicating information between the Publisher(s) 210, C&C Engine 126, and Subscriber(s) 220.

All the information contained in these three components as defined by the Account holder is referenced by that unique Conversion Profile ID created in step 420.

15 Each of these components are defined further below.

Addressing Information The Account holder first defines what users, publishers and subscribers are to be utilized for generating and receiving the Events. For example, the transaction may be a Catalogue Update (Event Type), and the Publisher(s) 210 may be a manufacturer, and the Subscriber(s) 220 may be a web site. As part of identifying the Publisher(s) 210 and Subscriber(s) 220, the Account holder defines their "Addresses", which are the logical (electronic) addresses associated with the Publisher(s) 210 and Subscriber(s) 220. Security Codes may be established for the Publisher(s) 210 and Subscriber(s) 220, and a security code may also be established to allow access to that Conversion Profile by the associated users.

So the Account holder preferably selects a name, location, and security code for each of the Publisher(s) 210 and Subscriber(s) 220. As noted, there may be more than one Publisher(s) 210 and more than one Subscriber(s) 220
5 associated with a given Conversion Profile. As determined by name and/or security code, all the appropriate Publisher(s) 210 and Subscriber(s) 220 will preferably be provided with access to that Conversion Profile by the Account holder, either by name and/or through a security
10 code.

Map Template After setting up the users, the next step for the Account holder is to create a Map Template. The Map Template consists of all information relating to source information for Publisher(s) 210 and the target
15 information for Subscriber(s) 220, as well as all conversions needed to convert source information into the appropriate information for the target. For example, assuming the Event is to be a file or records received from a Publisher, then for the source file generated, a
20 definition file is utilized or created containing the field names and all the information that is associated with each field (length (e.g., in bytes), field type, and the like). Similarly the same process is used for determining the information to be included in the Target file or records to
25 be provided for the Subscriber. As part of the source and target definition files, there should also be a determination and stipulation as to the desired file formats as well. As examples, the source or target file

formats may be XML, CSV, RTF, Delimited, or Fixed Length as examples. Alternatively the file format may be some pre-structured format such as ANSI X.12 (EDI), EDIFACT, or any third party designated structured format such as an 5 industry standard (such as RosettaNet or UCCNET). Any other file format may be utilized as well.

A Map Template may be created on a custom basis, or selected from a listing of the pre-existing Map Templates that are referenced by Topic and Event Type, which listing 10 is preferably stored in the Event Types database 330. Map Templates from prior Conversion Profiles are preferably used so that the time to set up the Map Template may be diminished by choosing a Map Template that has already been created to meet a substantially identical or similar need. 15 So Map Templates may be selected from a prior list and then customized (as needed), or they may be generated afresh. Thus the Account holder, who is creating the Conversion Profile, has the option of starting from an existing Map Template and then customizing it as needed, or beginning 20 from a blank Map Template and creating a new one.

A critical element of the Map Template is to link (i.e., map) fields in the source definition file to the appropriate fields in the target or destination definition file. This includes noting exactly which source fields map 25 directly to which target fields, and where a one-to-one and direct mapping of fields is not possible, then including logical operators to convey whatever changes are needed. Some examples of logical operators that can be performed in

mapping fields from a source file to a target file are the following:

- a. A concatenation of two fields into one, such as "232 Mildred Lane" and "Suite 1B", into the single field
5 "232 Mildred Lane, Suite 1B"
- b. A calculation such as the addition of two fields such as "5" lbs and "25" lbs becoming "30" lbs
- c. The changing of field abbreviations such as "USA" into "US" and the like.
- 10 d. The parsing of fields which are combined into separate fields such as "30 lbs" being divided into "30" (units per case), and "lbs" (as a unit of measure or unit label).
- e. A "Loop" condition in which one step is performed
15 first and then a second step is performed next (and a third if necessary and so on). An example of this is conversion of data in one field recorded as "4/30oz. Little Bear Refried Beans" into first "4/30oz" and "Little Bear Refried Beans" and then second conversion of the "4/30oz" field
20 into "4" units per case and "30oz" unit of measure (or unit label).

The above logical operators are but a few of many mapping functions that are commonly used and known, and which are readily ascertained by analysis of mapping
25 applications offered by a number of vendors. These mapping functions are preferably offered as part of the C&C Engine
126 by such means as may be readily understood and applied

by the Account holder while they are creating the Conversion Profile, and more specifically the Map Template.

As noted above, it may generally be more efficient for the Account holder who is creating new Conversion Profiles if the Account holder may access and use as starting points an existing Map Template that can approximate or almost precisely address the specific needs. However, as increasing numbers of Account holders utilize C&C Engine 126 and each one adds multiple Conversion Profiles, there will be a buildup of numerous Conversion Profiles which will make it difficult for subsequent users to easily identify and use prior Map Templates to assist in creating new Conversion Profiles. Therefore, to promote ease of identification and access of Conversion Profiles by the user, Conversion Profiles may generally be categorized under Event Types. Some examples of Event Types can be Purchase Orders, Product Information Update, Catalogue Update, Place/Receive Order, Order Acknowledgment, Invoice, Payment, Inventory Update, Shipping Notice, Shipment Schedule, Product Credit, or specifically formatted accounting information (such as accounts receivable, accounts payable, inventory, fixed assets) and the like. In addition, formats such as ANSI X.12 (EDI), EFIFACT, UCCNET, or any other industry standard structures or formats may be offered. Such groupings of Conversion Profiles by Event Types may thus make it easier for the Account holder to search for like Map Templates for their new Conversion Profile.

Just as Conversion Profiles will tend to proliferate, so too will Event Types tend to proliferate in the C&C Engine 126 and thus another higher aggregation level is offered in which Event Types may be grouped under Topics.

5 For example, the Event Types referred to as Catalogue Upload, Place/Receive Order, Order Acknowledgment (which are three typical order processing functions associated with e-commerce) may be grouped under a Topic called "Order Processing". Similarly, some examples of Event Types under

10 the Topic of "Accounting" can be Purchase Order, Invoice, Order, Payment, Credit, Customer, Supplier, Inventory, which are also functional areas where accounting applications may typically be required to interface with external applications or devices. Some examples of Event

15 Types under the Topic of "Transportation" are Advance Shipment Notice, Shipment (such as a Bill of Lading), Tracking (such as a tracking number for tracking shipments), and Delivery (such as a delivery date and received by indicator) which represent some of the common

20 areas covered in shipping products between distinct entities. Some examples of Event Types under "General" can be Sports (sports scores), Music (new releases), and Stock Quotes (streaming or delayed), or even News (by subject such as Nationality, Ethnic Group, Economic, Political,

25 Social, Company, or Religious) which are areas of interest that persons may access from third party entities such as news, media, or financial organizations.

Event Types and Topics are thus made available to the Account holder to make easier the process of locating like Map Templates of prior Conversion Profiles to assist in creating new Conversion Profiles. One key area of the Map

5 Template that is preferably easily accessible to users are the definition files that are typical of that type of transaction. For example information utilized in a purchase order typically includes the purchase order number, the date, the product listing, the quantities of each product,

10 the extended totals (price times quantity), and the total purchase order amount. For an Event Type call "Purchase Order", this definition file is preferably stored in a Purchase Order Map Template, where it can be accessed by any Account holder that is forming source or target

15 definition files as part of creating a new Conversion Profile called Purchase Order. There can be many versions of definition files that are stored under each Event Type so that the user can select whichever version most closely suits the user's needs when they are creating the Map

20 Template portion of their Conversion Profile.

In the context of the invention, an Event that is received by the C&C Engine 126 from one or more Publisher(s) 210 is thus preferably converted into the format and structure that is appropriate for receipt by one

25 or more Subscriber(s) 220 by means of implementation of the Map Template that is associated with that Event's Conversion Profile. The Communications Information is the third element of the Conversion Profile.

Communications Information The last of the three key components of the Conversion Profile is the Communications Information. The following describes communications related information that is needed for processing, storing, 5 and transmitting Events between the Publisher(s) 210, C&C Engine 126, and Subscriber(s) 220.

Transmission of data between the C&C Engine 126 and Publisher(s) are preferably achieved by the C&C Engine 126 receiving data that is "pushed" to it by the Publisher(s). 10 In this mode, the C&C Engine 126 is set to "wait" for Event data to be received by it, and once received the incoming Event is processed according to its associated Conversion Profile. Alternatively, the C&C Engine 126 may be set to query the Publisher(s) by means of a "poll" approach. If a 15 poll approach is used then the Publisher(s) address and frequency of polling are preferably set as well. If a poll approach is used, then a limit should be set as to the number of attempts that should be initiated within a given time period. In either "wait" or "poll" mode a security 20 code can be set for the Conversion Profile based on a selectable security protocol (which can be SLL as one example of a security protocol).

Transmission of data between the C&C Engine 126 and Subscriber(s) 220 are preferably achieved by data being 25 "pulled" from the C&C Engine 126 by one or more of Subscriber(s) 220. In this mode, the C&C Engine 126 is set to "wait" and one or more Subscriber(s) 220 will initiate a query to the C&C Engine 126 for any Event that is stored in

the C&C Engine 126 for this one or more Subscriber(s) 220. Alternatively, the C&C Engine 126 may be set to initiate transmission to Subscriber(s) 220 by means of a "send" process. If a send approach is used, then the 5 Subscriber(s) address, the timing of the sending (either immediately or on a certain day of week and time of day) and a frequency of sending are preferably set, as well as a stop limit on the number of attempts within a given time period. In either "wait" or "send" mode, the security 10 level can be set for the Conversion Profile that can be SSL, as one example of a security setting.

Communication between Publisher(s) 210, the C&C Engine 126, and Subscriber(s) 220 is preferably achieved via the communication network 101, and more specifically the 15 Internet using http, https, TCP/IP or any other protocol that enables use of a common telecommunications infrastructure that exists between the parties. In addition or alternatively, dial-up communications or file transfer protocol (FTP) may be utilized wherein files may be 20 forwarded specifically based on pre-programmed source and target locations.

Thus, the arrangements established in the Conversion Profile by which Events may be transmitted between publishers, the C&C Engine, and subscribers may vary 25 substantially. Asynchronous and synchronous transmissions may both be afforded under the disclosed invention. For example, the invention may provide for batch, scheduled, or real time transmission capabilities, the selection of which

may preferably be associated with the Conversion Profile as part of the Communications Information. On the input side (i.e., from the source object), the invention may encompass a query of multiple publishers by the C&C Engine 126 in 5 which, on a batch, scheduled, or real time basis, the C&C Engine 126 obtains information from the publishers (i.e., through the "poll" approach as opposed to the "wait" approach). For example, the C&C Engine 126 may be set up for a certain Conversion Profile consisting of multiple 10 sales offices (publishers) to be queried by the C&C Engine at pre-determined intervals.

Similarly, the invention is also not limited to only those Conversion Profiles in which the Subscriber request for information activates transmission of (i.e., "pulls") 15 the mutated Event. For example, the invention may encompass transmission of any Event in which on a batch, scheduled, or real time basis, the C&C Engine 126 sends information to one or more Subscribers under certain decision rules. One example of this is where mutated 20 Events under a Conversion Profile are stored until a certain physical limit condition is attained (say 500 kilobytes), whereupon the stored mutated Events are then made available for communication to the appropriate Subscriber(s). Another example is where mutated Events may 25 be stored until certain time parameters have occurred (e.g., every three hours, such as 12 PM, 3PM, 6PM, etc.), whereupon data may then be forwarded. Another example is where mutated Events are stored until transmission on one

or more specific dates and times (e.g., March 30, 2004, 12 AM, April 30, 2004, 12 AM, and so on). In another embodiment, mutated Events may be stored indefinitely, thus providing a permanent off-site storage solution for a 5 company.

These examples of the communication arrangements associated with the C&C Engine 126 are but a few of the alternative operating modes that may be associated with Communication Information of the Conversion Profile. While 10 such alternative modes of operation are not the preferred embodiment of the invention (the preferred embodiment being based on a publisher "push" and a subscriber "pull" approach), they are intended to be encompassed within the capabilities of the invention as such alternative 15 approaches may even be deemed preferable in certain applications.

An additional setting in Communications Information is preferably utilized which describes the insertion capability that is associated with the data associated with 20 the target object. For example, when an Event is processed through the target object, the process for the Event as utilized by a Subscriber(s) 220 may be to Append, (that is add new records), Overwrite (that is replace on a record by record basis), Replace Fully (that is replace all the 25 existing information with all the new information), or Update (which is only add any information which differs from that which exists). This insertion capability is predicated on a level of capability inherent within Target

Adapter M, Target Object M, or by functionality within the C&C Engine 126 which can create the appropriate data for transmission to the Subscriber(s) (such as comparative reference capabilities to prior updates of this same 5 Conversion Profile ID). Regardless of whether C&C Engine 126, Target Object M, or Target Adapter M will provide this insertion capability, a delete capability is preferably provided for interfacing to the Subscriber Y in addition to a simple insertion capability.

10 Some examples of the insertion capability are helpful to understand its utility. An example of "Replace Fully" would be where a supplier is updating their entire catalogue each week and wishes to replace all the existing information with the new information. An example of 15 "Append", is a web site that is taking orders and sending these orders to the associated order processing application. In this example, the new orders would be added to any existing orders from this web site. An example of "Overwrite" would be where a supplier wishes to update 20 product information but not change the listing of (ie add to or subtract from) the products offered.

A further function within Communication Information which may be needed is to couple and sequence Events with one or more other Events. For example, one Event may 25 trigger a submission of a different Event. A common occurrence of this is where a purchase order that may be filled (i.e., product is in inventory) generates an expected ship date for the order back to the originator of

the purchase order, and finally an invoice to the purchase order originator. In this example, a coupling will be made between three Conversion Profiles, namely, the Purchase Order Conversion Profile, the Shipping Notice Conversion 5 Profile, and the Invoice Conversion Profile. In such instances, a TransactionID is preferably also generated which denotes when an Event is part of a sequence of Conversion Profiles between a publisher and a subscriber. As may be noted here, the originator of the Purchase Order 10 is the publisher at first, but becomes the subscriber with respect to the shipping notice and the invoice. Similarly, the supplier of the product is the subscriber for the Purchase Order Conversion Profile, but becomes the publisher for Shipping Notice Conversion Profile and the 15 Invoice Conversion Profile. In the above example, this sequence of Conversion Profiles creates a reversal of the publisher and subscriber roles which is easily accommodated because the Purchase Order, Shipping Notice, and Invoices are each separate Conversion Profiles. (In addition, there 20 could be the addition of a payment Conversion Profile in payment of the invoices which would reverse the publisher/subscriber roles yet again.) It should be noted too that the completion of these Events is sequential, that is order dependent. The purchase order must be completed 25 first, then the shipping notice, then the invoice (and then finally the payment could be processed). The ability to couple and sequence Conversion Profiles is afforded within the invention.

It is also possible to establish a requirement for a return acknowledgment of an Event to be provided for both Events received from Publishers and for Events delivered to Subscribers. By instituting such a mode, then either 5 Publisher(s) 210 or C&C Engine 126 making a transmission will preferably have recorded on its behalf at minimum, a transmission completed bit, and preferably a date/time stamp indicating exactly when the bit was generated, indicating that a submitted Event was properly received at 10 the intended destination. By recording the stages of processing of the Event through system 100, the invention thus provides an independent audit trail of what Events have been communicated between publishers and the subscribers with respect to a given Conversion Profile.

15 In the preferred mode, where Events may be stored as XML files, there will likely be an accumulation of huge numbers of XML files stored in the Events Storehouse 360 of the C&C Engine 126. Therefore, it will be beneficial to provide a capability to delete Events after they have been 20 sent. The conditions under which Events are saved or deleted are preferably set as part of the Conversion Profile. If Events are to be stored, then either a deletion or archiving mode may be accommodated whereby Events for this Conversion Profile are either deleted or 25 archived based on certain decision rules. Such decision rules may include, delete or archive after X days, or delete or archive data beyond Y megabytes, Delete only after acknowledged by Subscriber, or "Never delete".

"Never delete" effectively utilizes the C&C Engine 126 as an off-site data warehouse for storage of Events associated with a Conversion Profile of the Account holder.

Since the invention provides for communication of a 5 variety of types of data, some presumably sensitive and some not, it is preferable the system provide capabilities for security for authentication and encryption, certain elements of which can be encompassed through any of Secure Socket Layer technology (SSL), PKI, and digital 10 certificates (additional authentication or data encryption/decryption techniques may also be employed). To ensure that files are properly transmitted and received from publishers and transmitted to subscribers (ie that the integrity of the Event is validated), file corruption and 15 error checking transmission technologies such as a checksum and cyclical redundancy checking (CRC) are preferably employed. In the Event of corrupt transmissions, then the information is preferably re-transmitted through the invention. Finally in the circumstance where Conversion 20 Profiles may encompass other Conversion Profiles that are order dependent, information may be contained in each transmission so as to provide an order sequence for the Events. By doing this, Events associated with other Conversion Profiles may also be properly processed by C&C 25 Engine 126 in the proper sequence.

The following Table 2 includes some of the key information that is maintained within a Conversion Profile.

Table 2

Information Contained in Conversion Profile Database

5 AccountID

Conversion Profile ID

Conversion Profile ID Security Code

Addressing Information

10 Publisher(s) - For each one

Publisher ID:

Logical Location:

User Name:

Security Code:

15 Subscriber(s) - For each one

SubscriberID:

Logical Location:

User Name:

Security Code:

20 Sequential Conversion Profile IDs

1.

2.

3.

...

25

(table 2 continued on next page)

(table 2 con't)

Map Template

5 Topic TypeID (Topic Type reference)
 Event TypeID (Event Type reference)
 Source File Fields
 Source File Format
 Target File Fields
 Target File Format
10 Mapping of Fields from Source To Target
 Logical Operators

Communications Information

15 From Publisher Mode (example is "Wait")
 Publisher Protocol (examples HTTP, FTP, Dial Up)
 To Subscriber Mode (example is "Wait")
 Publisher Protocol (examples HTTP, FTP, Dial Up)
 Subscriber Protocol (examples HTTP, FTP, Dial Up)
 Update Data by (example is "Replace Fully")
20 Acknowledgment with
 Publisher? Yes/No
 Subscriber? Yes/No
 Archiving (example is "After Acknowledged")
 Security (Choose Type(s))
25 Integrity Checking (Choose Type(s))

After the Conversion Profile is completed in Step 420 of Figure 4, the Account holder will next make a determination if adapters are needed to allow the publisher(s) and subscriber(s) to interface with the C&C Engine 126. If no adapters are needed, then the Conversion Profile is completed. If adapters are needed, then these adapters are obtained in step 450 from either the C&C Engine 126 and downloaded to the specific user's applications or devices, or they may be sourced from a third party. As noted previously adapters are widely available and each adapter is preferably constructed as Dynamic Link Library (DLL) which is then associated with the publisher(s) or subscriber(s) data processor.

For purposes of tracking Events as they are received, stored and converted, it is preferable to have an Event Log Database, as denoted by the reference numeral 370. As noted above, since Events are preferably stored as XML files there is a likelihood of a large accumulation of XML files that will occur in the Events Storehouse 360. There will accordingly be preferably provided some means for identifying which XML files are associated with the Events that are processed by a Conversion Profile, as well as where they are located. The "where" identifier field will preferably include the specific folder (or sub-directory) in which the Events for each Account holder and their associated Conversion Profile(s) are located. The "what" identifier field will preferably provide a listing of the

file names for the Events that are stored in that specific folder (or sub-directory).

The SessionID is generated at each occasion of a receipt and submission of one or more Events with respect to each Conversion Profile of a given Account holder. The SessionID is thus a unique number that is generated for one Event or a series of Events which are received based on a beginning Event and an ending Event for a given time span. For example, a Catalogue Update of 16,000 SKUs occurs for a given AccountID and Conversion ProfileID, and the Events associated with this Catalogue Update are 16,000 XML files, and the start time is 8:00 AM and the end time is 8:20AM on October 23, 2003, and this Catalogue Update occasion is then preferably assigned a specific unique SessionID. Thus each SessionID uniquely denotes the occasion of an Account holder, Conversion Profile, and a series of "time contiguous" Event receipts and transmissions for a given Conversion Profile. For Conversion Profiles which represent asynchronous processes separated by extended time periods, there are preferably multiple distinct SessionIDs created for the receiving of Events by the C&C Engine 126 and the retrieval of Events from the C&C Engine 126 by the subscriber(s). Where multiple publishers or subscribers are utilized in a given Conversion Profile, then SessionIDs preferably reflect the Sessions associated with the events and communications of each publishers and subscriber. Table 3 below provides some preferable fields associated with

Event Log Database 370 which serves as a reference repository within the C&C Engine 126.

Table 3

5 Certain Fields Associated with the Event Log Database

AccountID

Conversion ProfileID

CP Event # (#s of events in the Conversion Profile)

10 CP Size (total bytes all events in the Conversion Profile)

By Session

PublisherID

SubscriberID

15 SessionID (provides a unique ID for each session)

Sess Event #s (quantities of events in the session)

Events Size (total bytes all events in the session)

"where" data identifier (e.g., folder where the data is)

"what" data identifier (e.g., file names of Events)

20

(table 3 continued on next page)

(table 3 continued)

For each Event

25 Event received date/time stamp (received by C&C Engine 126)

Event transmitted date/time stamp (to Subscriber(s) 220)

acknowledged to publisher(s) yes/no, if yes date/time

acknowledged from subscriber(s) yes/no, if yes date/time

* * *

As an example of the invention being used in practice, assume an order is placed on a web site (referred to as CoopShopper™) for a Supplier ABC's product(s). The "Event" is thus an order for the product(s) of this supplier through this web site. In this example the Account holder is Supplier ABC, the publisher is the CoopShopper™ web site (located at a remote hosting site), and the supplier's local computer situated at the supplier's warehouse (the location of the product(s)) is the subscriber. The CoopShopper™ web site generates an XML file format that is to be converted into a CSV format used by the supplier's local application for accepting orders into their own system. All of this is incorporated into the Map Template. The CoopShopper™ web site will publish ("push") the order to the C&C Engine 126, which will receive and convert the data into a mutated Event based on the Map Template. Supplier ABC as Subscriber will retrieve ("pull") the order from the C&C Engine 126 as a mutated Event. The Map Template is based on the Event Type: "Place/Receive Order" (Under the Topic of: "Order Processing"), and the Conversion Profile ID that is generated is PRO-SABC-0001 (Place/Receive Order, Supplier ABC, first Conversion Profile). We assume that Supplier ABC has registered as Account holder, the Conversion Profile PRO-SABC-0001 has been created, and that Supplier ABC has already set up its local computer with an adapter

that will retrieve data from the C&C Engine 126 and insert the data into the Supplier's own local order processing and/or accounting application(s).

In this example, the web site named CoopShopper™ is 5 operated by a third party that is a separate and distinct entity from the supplier. Turning to FIGURE 5, this order on the web site is updated to the supplier as follows. Customers in CoopShopper™ will place their order as denoted in step 505. As part of the web application, CoopShopper™ 10 generates an Event and sends it to the C&C Engine as denoted in step 510. In step 512, the C&C Engine 126 receives the Event. In step 515, the received Event is logged in the Event Log Database 370 and a SessionID is created for that AccountID/Conversion ProfileID referencing 15 all the "time contiguous" Events received for that occasion. In step 516, it is determined if each Event is valid, which involves checking internally if the Conversion ProfileID and the security code(s) (if any) that are associated with the Event are valid and if the data (both 20 format and content) associated with the Event are both correct and complete (integrity check) with respect to that Conversion Profile. If the Event is not valid, then in step 518 it is next determined if an acknowledgment is to be sent to the publisher (CoopShopper). If an 25 acknowledgment is not required, then processing is completed, and the Event may be transferred from Events Storehouse 360 to a "Failed Events" storage area (not shown). If an acknowledgment in 518 to the publisher is

required under this Conversion Profile, then an acknowledgment is sent to the publisher as per step 522 and processing passes to 527. A logical limit on re-submission attempts is set as denoted in 527 and if the logical limit 5 has been met, then no further acknowledgment is required. If the logical limit has not been met in 527, then processing next proceeds to step 528 where the acknowledgment is sent to the Publisher Coopshopper and processing again as in step 510.

10 If in step 516 the Event is determined to be valid, then processing next proceeds to Figure 5B and step 530. If an acknowledgment of a validly received Event is required for the publisher under this Conversion Profile, then as denoted in step 535, the acknowledgment is stored 15 in the Event Log Database 370 and updated to the Publisher as per the appropriate means (not shown). If an acknowledgment is not required, or after the acknowledgment has been made, action next proceeds to step 540 wherein the Event is processed in C&C Engine 126 based on its 20 associated Conversion Profile as denoted in step 540.

As noted previously, each Event received by the C&C Engine 126 is preferably processed according to its Map Template that was defined and included within the Conversion Profile associated with that Event. 25 Accordingly, in step 540 the conversion within the C&C Engine 126 consists of associating the Event to its Conversion Profile, and then performing the conversion to create a mutated Event that then conforms to the

appropriate format for the subscriber, which in this example is the supplier of the product. After the Event is processed in step 540, the mutated Event is noted (flagged) as ready for retrieval in the C&C Engine 126 as denoted in 5 step 545. At this point, since the wait ("pull") mode has been selected for this Conversion Profile, as noted in step 546 no further action is required until the subscriber (in this case the supplier) initiates the request as noted in 547.

10 In step 547, the subscriber retrieves the Event by means of "pulling", that is querying the C&C Engine 126, which based on the SubscriberID (and if utilized, the security code) which allows the subscriber to retrieve the mutated Event. In step 548, the request from the 15 subscriber is received by the C&C Engine 126. In step 549, the (mutated) Event is transmitted and the SessionID is then updated in Event Log Database 370. In step 555, it is determined if an acknowledgment is required, whereupon if one is required, in step 560 a return acknowledgment is 20 recorded in the Event Log Database 370 and sent to the Publisher (not shown).

After the mutated Event is transmitted by the C&C Engine as noted in step 549 it is received by the 25 subscriber in step 550, and processed in step 565 according to the target adapter and the order processing application software of the supplier, who is the subscriber in this example. Thus, in this example in step 565 the order for

the product will be received by the supplier's order processing or accounting application in the proper format for assimilation into the subscriber's application.

A second, more illustrative example of the power of 5 the C&C Engine 126 is demonstrated by increasing the scope of activities (ie the number of Conversion Profiles) covered by the integration between the aforementioned Supplier ABC and the web site CoopShopper. In the following table, the web based sales order processing 10 system is integrated with the supplier's in-house sales, accounting, warehouse, and shipping operations. This example results in a series of Conversion Profiles related to the Supplier ABC and the CoopShopper web site. Using our prior example, the publisher or subscriber of each of 15 these Conversion Profiles are either the Supplier ABC or the web site CoopShopper as noted in Table 4 below.

Table 4

Conversion Profiles

5

| <u>Event Type</u> | <u>Publisher</u> | <u>Subscriber</u> |
|-------------------------|------------------------|------------------------|
| Catalogue Upload | Supplier ABC | Web Site (CoopShopper) |
| Place Order | Web Site (CoopShopper) | Supplier ABC |
| Inventory Available | Supplier ABC | Web Site (CoopShopper) |
| Shipping Notice | Supplier ABC | Web Site (CoopShopper) |
| Product Credit Request | Web Site (CoopShopper) | Supplier ABC |
| Product Credit Approval | Supplier ABC | Web Site (CoopShopper) |

Other applications in addition to the e-commerce web based ordering example cited above are numerous and include news services, shipping companies, transportation logistics companies, accounting, inventory, payables, invoicing, and enterprise based applications. The above examples have involved applications but presently known devices that can be utilized by publishers or subscribers include computers, cell phones, telephones, personal digital assistants, fax machines (by coupling this with Optical Character Recognition), and any other device capable of generating or receiving electronic transmission of information. Some further general examples as to how the invention may be utilized are described next below.

10
15
20

Example 1: On-Line Internet Sales (web site - local accounting system, either way)

The invention may be used to provide data 5 communications between a multi-user Application Service Provider (an ASP such as a web site that is used by more than one entity such as eBay, Yahoo, or Amazon) to many accounting programs that are operating on local computers associated with the users of the multi-user ASP. Web site 10 sales thus may be a term for the Event Type in this example. Each seller over the ASP is registered in the C&C Engine 126 as an Account holder and as a publisher. The third party web site, such as eBay, Yahoo, or Amazon, allows publishing of sales data to the C&C Engine 126 so 15 that each user of the ASP (such as Ebay) is able to generate web site sales data for receipt by the C&C Engine 126. Any sales that are made by that Account holder (ie each publisher) are automatically associated with that publisher in the C&C Engine with the sales data being 20 passed to the subscriber, which is the Account holder's local accounting system. For example, each Account holder will set up a Conversion Profile appropriate for publishing its sales from the ASP (say Ebay) to the internal accounting system of the Account holder which will be the 25 subscriber of that Conversion Profile. Each sale from a user (publisher) that has established an Account and Conversion Profile that is made over the multi-user ASP generates an Event that is submitted to the C&C Engine 126.

The C&C Engine 126 accepts such Event and converts the Event based on its Conversion Profile via a mutator to a format and structure acceptable to that subscriber's local accounting system. This may be accomplished in either real 5 time, scheduled, or batch mode via the C&C Engine 126. It should be noted that information may also be sent in reverse direction through creation of a different publisher-subscriber Conversion Profile. That is sales leading to inventory reductions that are by the Account 10 holder off-line (say directly through sales reps working selling product outside of the ASP's web site) may be updated to the web site to indicate when inventory may no longer be available for purchase on-line. In this second example, the publisher would be the user's inventory 15 application or accounting system, the web site would be the subscriber, and "Inventory Update" might be the logical nomenclature for the Event Type.

Example 2: Game Web Site (web to web and/or web to device)

20

The invention may be used to receive data from various news feeds to update a web site offering a system of role based games and gaming that is associated with a sport, such as football, baseball, basketball and the like (eg 25 Fantasy Football). The incoming sports data required by the web site offering the game can be converted from the format of the feed directly into a format that the web site that is offering the role based game can utilize. The

Event Type may be called, Live Football Stats, and the generator of the sports data would be the publisher. The provider of the sports game web site would be the subscriber. The web site providing the games can then 5 generate notifications based on changes in a user's position that result from the statistical data received by the sports game web site as a competitive advantage over other systems that require manual updating or time delayed updating.

10 The C&C Engine is thus also used to send to each user of the sports game web site notifications based on the differing parties e-mail, fax, phone, or any other device based communication selected by the user. In this latter update mode, the Event Type may be termed "Game Status", 15 and a different Conversion Profile is preferably associated with users for updates by e-mail, fax and phone. This example shows how the invention may be used to employ at least two Event Types, where one of these Event Types is associated with an application and another is associated 20 with a device.

Example 3: TIVO System (web-to-device or device-to-web-to-device)

25 The invention may be used to access a web site which can activate a machine at home to record a program such as is offered by TIVO. The Event Type may be termed, "TIVO Record", and for this Conversion Profile the web site would

be the publisher and the subscriber would be the TIVO system at the person's home. For another Conversion Profile, the publisher would be the person's telephone and the subscriber would be the TIVO system at the person's 5 home. For example, a person away from home may send a message through their telephone or personal digital assistant which is received by the C&C Engine 126 which then converts the received message into a form accessible by a TIVO system located in that person's home. In 10 another application, a third Conversion Profile the publisher can be the person's Personal Digital Assistant and the subscriber would again be the TIVO system at the person's home. This application shows how the invention may be used where the publisher is a web site and the 15 subscriber is a device as well as where both the publisher and the subscriber are devices. It also shows where two Conversion Profiles may be established to handle different originating device types but where each of these is directed to a common target device.

20

Example 4: Security System (device-to-web and then coupled to a web service coupled to a telephone system)

The invention may be used to interface a home security 25 and fire detection system with a web site system such as the C&C Engine 126 being linked to access public services. In the Event of a security breach the security system may publish a message which is received by the C&C Engine 126

and transmitted in proper format for receipt by police and other emergency service providers who may be notifiable on a real-time (virtually instantaneous) basis. In this example, the publisher is the device in a home, and the 5 subscribers may be a web service that receive messages and directs these to the appropriate local police department and the local fire department based on geographic locale of the publisher.

10 Example 5: Storage of Data Off-line (source object-to-web)

The invention may be applied as a means to store information for a company as may be communicated to or through the C&C Engine 126. For example, data related to 15 any application or device as may be communicated via the C&C Engine 126 may also be stored within the Events Storehouse 360 for an indefinite length of time. Then, should the originating device which may also store such Events (or the precursor information to such Events) fail, 20 a subscriber may log in and retrieve all information that has been retained for that subscriber from a separate device and continue forward without loss of the communicated information. The Event Type in this example may be termed "Off-Line Storage" and the publisher would be 25 any originator of data and the subscriber would be "Data Storage", which would be associated with that Account holder. There would not be a need for an external subscriber although one may be added if desired.

Example 6: Logistics (device- or computer-to-web-to-computer)

5 A number of private trucking companies typically provide shipments via containers to a shipping port, wherein each container may contain a number of products. In international shipments, there are increasing security requirements for registering the contents of each container
10 with the appropriate authorities, which include both the (ocean-going cargo or rail) carrier and US Customs. The data formats and structure of the information concerning the contents of the shipment typically vary considerably for rail and truck shippers. Similarly formats for cargo
15 carriers and US Customs also vary. In this example, the various shippers' (such as trucking companies) data is converted to a format acceptable to the cargo carrier and US Customs through the C&C Engine 126, which also may be a requirement for sharing information electronically. The
20 C&C Engine may be utilized to convert the data stored in the varied file formats of each trucking company and convey the converted data in formats which are acceptable to the ocean going carriers and for US Customs based on the pre-established publisher-subscriber pairs. In this case the
25 shippers (trucking companies) are publishers, and cargo companies are subscribers. In addition, the US Customs service is a subscriber and the publishers may be either a shipping company or a cargo company.

Example 7: On Line Bill Payments (computer to web site to computer)

5 Many banks and vendors are now offering services that allow consumers to pay bills on line. Often the bills from the vendors are first scanned to create an electronic file which is then presented to the consumer for payment in an electronic format. Using the C&C Engine, vendors may
10 electronically create and send such bills to the C&C Engine. Bills would be associated with an Event Type (eg New Jersey Power & Light Gas Bill). Subscribers such as on-line bill payment service companies may then retrieve such electronic bills and post these to the appropriate
15 customer accounts for payment by the customer at their discretion. Users viewing the bill would see the information populated in the bill but under the invoice look and feel associated with the vendor. Finally, each such Event Type may be associated with an accounting
20 category and the actual payment when submitted by the consumer through the on-line billing company may then be sent through the C&C Engine as a certain Event Type (eg online accounting) and the subscriber may be that consumers personal accounting software located at the person's home.
25 In this way, the utility company saves paper and mailing costs, the online bill paying company saves scanning and handling costs, and the consumer updates their personal accounting at the same time as they pay their bills

electronically and are also able to view the bills as they are used to viewing them.

5 Example 8: Sales Aggregation (multi-site computers to web site to single computer)

A company with 100 different sales offices collecting sales data in say 8 different sales formats and structures may establish a Conversion Profile under which the C&C Engine 126 will query each of its 100 offices at timed intervals, then convert any sales information from that office into a single mutated format based on each of the 8 associated Conversion Profiles (one for each originating format and structure). That converted information may then be forwarded immediately to the subscriber (headquarters) or at timed intervals which is part of a scheduled process. This can be based on the subscriber, that is the central computer at a company's headquarters running an application which may aggregate all the sales information for that company at certain times. In this example, Sales Data may be termed the Event Type and each upload of a publisher's sales data may be one or more Events. The sales offices are the publishers and the company's headquarters would be the subscriber. There would be different source file formats corresponding to the Conversion Profiles for the 8 source types for each sales format. However the target file format, that used by Headquarters, may be the same for all.

It should be noted that the utility of the invention is enhanced both by its ability to convey disparate information that is stored in different formats between many publishers and many subscribers as well as through the 5 capabilities of the invention to ensure the security and integrity of the data that is passed in the transmissions which may occur remotely whether generated for, or to be received by, applications or devices. Although not required, the invention may also be used for maintaining 10 pre-defined scheduled arrangements for communicating information that is specific to a publisher-subscriber pair.

Having thus described the present invention by reference to certain of its preferred embodiments, it is 15 noted that the embodiments disclosed are illustrative rather than limiting in nature and that a wide range of variations, modifications, changes, and substitutions are contemplated in the foregoing disclosure and, in some instances, some features of the present invention may be 20 employed without a corresponding use of the other features. Many such variations and modifications may be considered obvious and desirable by those skilled in the art based upon a review of the foregoing description of preferred embodiments. Accordingly, it is appropriate that the 25 appended claims be construed broadly and in a manner consistent with the scope of the invention and that the claims will therefore cover any such modifications or

embodiments that fall within the true scope and spirit of the invention.